



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AND

OFFICE OF
PREVENTION, PESTICIDES,
TOXIC SUBSTANCES

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MEMORANDUM

February 4, 2000

SUBJECT: **Vinclozolin and Its Degradates:** Tier II Drinking Water EECs for Use in the Human Health Risk Assessment.

TO: Deanna Scher, PM Team Reviewer
Susan Lewis, Chief
Special Review and Reregistration Division (RB1)

FROM: Dirk F. Young, Ph.D., Environmental Engineer
Environmental Fate and Effects Division (7507C)

THRU: Mah T. Shamim, Ph.D., Chief
ERB IV/EFED (7507C)

Summary

This memo summarizes the Tier II estimated environmental concentrations (EECs) for vinclozolin and its degradates for use in the human health risk assessments. The degradate, 3,5-dichloroanaline (DCA), is used as a surrogate for calculating the EECs of the major degradates in surface water and in ground water. These major degradates include DCA, N-(3,5-dichlorophenyl)carbamic acid (1-carboxyl-1-methyl)-2-propyl ester (referred to by the registrant and herein as metabolite B), and N-(3,5-dichlorophenyl)-2-hydroxy-2-methyl-3-butenoic acid amide (referred to by the registrant and herein as metabolite E). The EECs are summarized in Table 1.

Table 1. Tier II Drinking water EECs for Drinking Water

	Surface Water Peak EEC ^a	Surface Water Chronic EEC ^b	Ground Water EEC
vinclozolin	5.68 : g/L	0.165 : g/L	0.53 : g/L
DCA	26 : g/L (0.16 µmole/L)	3.12 : g/L (0.019 µmole/L)	2.65 : g/L (0.016 µmole/L)

^a Peak EEC represents the upper 1-in-10 year peak concentration.

^b Chronic EEC represents the upper 1-in-10 year mean annual concentration.

Approach

Vinclozolin degrades by metabolism, photolysis, and hydrolysis, producing DCA and a few other degradation products (primarily metabolites B and E) which ultimately degrade to DCA. Due to the lack of persistence and mobility data for these metabolites, an individual analysis for each of the degradates was not performed. Instead, EFED chose to use DCA as a surrogate for all three major metabolites. DCA is an appropriate choice as a surrogate since DCA is likely to be more persistent and of similar mobility as the metabolites B and E. Furthermore, since the metabolites B and E can degrade to DCA, using DCA as the surrogate should give conservative estimates of total degradate concentrations.

Although persistence and mobility data are lacking for the metabolites, some information that supports the use of DCA as a surrogate could be derived from registrant-submitted reports. For example, in a registrant-submitted batch sorption study (MRID 44025304), there was no significant difference between the K_{oc} values of DCA and metabolite E (t-test showed that they differed only at the 53% confidence level), suggesting that DCA and metabolite E are of similar mobility. The registrant has not submitted sorption studies for metabolite B, but leaching studies suggest that metabolite B has a similar mobility as that of DCA and metabolite E (MRID136381 and 41496904). Accurate persistence data is also not available for either metabolite B or E, but field dissipation and aerobic soil metabolism studies suggest that B and E are much less persistent than DCA (see memo from Jacobe²). Experimental evidence has shown DCA to be resistant to degradation processes (see memo from Abel¹ and references therein). Since DCA is likely much more persistent and of similar or greater mobility than the intermediates B and E, the concentrations of these individual degradates should be lower than for DCA (on a mole concentration basis).

Vinclozolin

EFED used standard procedures to determine the surface water EECs for vinclozolin. This procedure involved using PRZM/EXAMS to simulate a 36-year period of vinclozolin use at the maximum allowable application rate on an onion field in Stanislaus County, California. This onion scenario likely produces upper-bound EECs. A summary of the parameters used for the PRZM/EXAMS simulations is given in Table 2. All vinclozolin parameters were taken according to standard EFED practice, including the use of the index reservoir and the percent crop area factor. The input file is located in Attachment 1, and the output file is in Attachment 2. EECs presented in Table 1 are equal to the EECs in Attachment 3 multiplied by the percent crop area factor (see Table 2).

The ground water EEC in Table 1 was generated with SCIGROW. Input parameters and output for the SCIGROW run can be found in Attachment 3. All parameters used as inputs were chosen according to standard EFED practice.

DCA

In order to simulate DCA concentrations, EFED used a variation of the method which it previously used to simulate DCA¹. The variation involved an adjustment for undegraded vinclozolin, as discussed below. In the present simulation, EFED initially assumed that all vinclozolin instantaneously and completely degrades to DCA. Therefore, the application rate was taken as the rate of vinclozolin

application adjusted for the molecular weight difference between the two compounds (i.e., $\text{Rate}_{\text{DCA}} = \text{Rate}_{\text{vinclozolin}} \times \text{MW}_{\text{DCA}}/\text{MW}_{\text{vinclozolin}}$). Fate parameters were taken from the memo for the previous analysis of DCA¹. Parameters used in the simulations are summarized in Table 2. The PRZM input file for DCA is located in Attachment 4, and the pond output is located in Attachment 5.

In the DCA simulation, it was assumed that all vinclozolin degraded to DCA; however, as the vinclozolin simulation showed (see above), some vinclozolin did enter the pond. Therefore, in order to achieve some mass balance, the mean annual DCA concentrations were adjusted to account for some of the undegraded vinclozolin. This adjustment was only performed for the chronic EEC. The peak EEC was not adjusted in this manner because peak DCA and peak vinclozolin concentrations are not transported simultaneously due to mobility differences. The longer-term mean concentrations, however, can be reasonably adjusted in this manner.

Details of the calculations used to make the adjustment and the data used are given in Attachment 6. In short, the yearly mean pond concentration of vinclozolin for any given year was multiplied by the ratio of the molecular weight of DCA to the molecular weight of vinclozolin. The resulting product gives the yearly mean equivalent concentration of DCA that was *not* formed due to vinclozolin degradation. This equivalent concentration of DCA was subtracted from the yearly mean DCA concentration for each year, as determined from the PRZM/EXAMS simulation which assumed complete vinclozolin degradation. The difference is the surface water EEC for DCA.

The ground water EEC for DCA in Table 1 was generated with SCIGROW. Input parameters and output for the SCIGROW run can be found in Attachment 7. All parameters used as inputs were chosen according to standard EFED practice.

Table 2. PRZM/EXAMS environmental fate input parameters

chemicals	vinclozolin and DCA
molecular weight	vinclozolin: 286.1 DCA: 162.03
Solubility	vinclozolin: 2.6 mg L ⁻¹ DCA: 224 mg L ⁻¹
vapor pressure	vinclozolin: 2.6 x 10 ⁻⁶ torr DCA: 0.0212 torr
pH 7 hydrolysis half life	vinclozolin: 1.3 days DCA: stable
aqueous photolysis half life (near surface)	vinclozolin: 27.6 days DCA: stable
aerobic soil metabolism half life	vinclozolin: 52.9 days (90% C.I. on mean used for PRZM) 45.5 days (mean value used for SCIGROW) DCA: stable
aerobic aquatic metabolism half life	vinclozolin: 106 days (2 x 52.9 day soil metabolism) DCA: stable
anaerobic aquatic metabolism half life	vinclozolin: 402 days (3 times value of single study) DCA: stable
soil organic carbon partitioning (Koc)	vinclozolin: 535 L kg ⁻¹ (mean value, used for PRZM/EXAMS) 505.5 L kg ⁻¹ (median value used for SCIGROW) DCA: 309 L kg ⁻¹
crop	onions
application rate	vinclozolin: 1 lb a.i. acre ⁻¹ DCA: 0.566 1 lb a.i. acre ⁻¹ (1 lb/acre * MW _{DCA} /MW _{vinclozolin})

number of applications	5
application method	aerial spray
flow rate (STFLO)	100.4 m ³ /hr (calculated from PRZM output)
spray drift	0.16 (standard for index reservoir)
spray efficiency	95% (standard for index reservoir)
Percent Crop Area	0.87 (default)

Reference

1. Memo of July 1, 1997. From Sid Abel to Kathryn Boyle. Tier II Surface Water EEC's for 3,5-dichloroanaline (DCA) from degradation of Vinclozolin and Iprodione: CASN 626-43-7.
2. Memo of August 1, 1995. From Henry Jacobe to Jay Ellenberger. Vinclozolin - List B RED Candidate.

ATTACHMENT 1: PRZM Input File for Vinclozolin

```
***on_index.inp, created 8 Dec 1999; Stanislaus county, CA.***
***Soil Hanford, Hydrologic Group B ***
***Assume poor grass coverage under vines and overland flow***
Vinclozolin
Hanford fine sandyloam; MLRA L-17, Stanislaus County, CA
***RECORD 3
    0.852    0.450        0    15.00        1        3
***RECORD 6
    4
***RECORD 7
    0.34     0.15      1.00    172.8      5.80        3    0.500    464.0
***RECORD 8
    1
***RECORD 9
    1     0.25    90.00   100.00        3    86    59    82    0.00    50.0
***RECORD 9A
    1     3
0101 0110 0111
0.05 0.05 0.05
.023 .023 .023
***RECORD 10
    36
070947 150448 010548        1
070948 150449 010549        1
070949 150450 010550        1
070950 150451 010551        1
070951 150452 010552        1
070952 150453 010553        1
070953 150454 010554        1
070954 150455 010555        1
070955 150456 010556        1
070956 150457 010557        1
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070957	150458	010558	1
070958	150459	010559	1
070959	150460	010560	1
070960	150461	010561	1
070961	150462	010562	1
070962	150463	010563	1
070963	150464	010564	1
070964	150465	010565	1
070965	150466	010566	1
070966	150467	010567	1
070967	150468	010568	1
070968	150469	010569	1
070969	150470	010570	1
070970	150471	010571	1
070971	150472	010572	1
070972	150473	010573	1
070973	150474	010574	1
070974	150475	010575	1
070975	150476	010576	1
070976	150477	010577	1
070977	150478	010578	1
070978	150479	010579	1
070979	150480	010580	1
070980	150481	010581	1
070981	150482	010582	1
070982	150483	010583	1

***RECORD 12

Application Schedule:aerial spray

***RECORD 13

180	1	0	0
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***RECORD 15

VINCONZOLIN

***RECORD 16

071048	0 2 0.00	1.12 0.95 0.16
211048	0 2 0.00	1.12 0.95 0.16
041148	0 2 0.00	1.12 0.95 0.16
181148	0 2 0.00	1.12 0.95 0.16
021248	0 2 0.00	1.12 0.95 0.16
071049	0 2 0.00	1.12 0.95 0.16
211049	0 2 0.00	1.12 0.95 0.16
041149	0 2 0.00	1.12 0.95 0.16
181149	0 2 0.00	1.12 0.95 0.16
021249	0 2 0.00	1.12 0.95 0.16
071050	0 2 0.00	1.12 0.95 0.16
211050	0 2 0.00	1.12 0.95 0.16
041150	0 2 0.00	1.12 0.95 0.16
181150	0 2 0.00	1.12 0.95 0.16
021250	0 2 0.00	1.12 0.95 0.16
071051	0 2 0.00	1.12 0.95 0.16
211051	0 2 0.00	1.12 0.95 0.16
041151	0 2 0.00	1.12 0.95 0.16
181151	0 2 0.00	1.12 0.95 0.16
021251	0 2 0.00	1.12 0.95 0.16
071052	0 2 0.00	1.12 0.95 0.16
211052	0 2 0.00	1.12 0.95 0.16

041152	0	2	0.00	1.12	0.95	0.16
181152	0	2	0.00	1.12	0.95	0.16
021252	0	2	0.00	1.12	0.95	0.16
071053	0	2	0.00	1.12	0.95	0.16
211053	0	2	0.00	1.12	0.95	0.16
041153	0	2	0.00	1.12	0.95	0.16
181153	0	2	0.00	1.12	0.95	0.16
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181155	0	2	0.00	1.12	0.95	0.16
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211056	0	2	0.00	1.12	0.95	0.16
041156	0	2	0.00	1.12	0.95	0.16
181156	0	2	0.00	1.12	0.95	0.16
021256	0	2	0.00	1.12	0.95	0.16
071057	0	2	0.00	1.12	0.95	0.16
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181157	0	2	0.00	1.12	0.95	0.16
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071058	0	2	0.00	1.12	0.95	0.16
211058	0	2	0.00	1.12	0.95	0.16
041158	0	2	0.00	1.12	0.95	0.16
181158	0	2	0.00	1.12	0.95	0.16
021258	0	2	0.00	1.12	0.95	0.16
071059	0	2	0.00	1.12	0.95	0.16
211059	0	2	0.00	1.12	0.95	0.16
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181159	0	2	0.00	1.12	0.95	0.16
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211060	0	2	0.00	1.12	0.95	0.16
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181160	0	2	0.00	1.12	0.95	0.16
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181161	0	2	0.00	1.12	0.95	0.16
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211065	0	2	0.00	1.12	0.95	0.16
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021265	0	2	0.00	1.12	0.95	0.16
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181169	0	2	0.00	1.12	0.95	0.16
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021273	0	2	0.00	1.12	0.95	0.16
071074	0	2	0.00	1.12	0.95	0.16
211074	0	2	0.00	1.12	0.95	0.16

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021278	0	2	0.00	1.12	0.95	0.16
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181179	0	2	0.00	1.12	0.95	0.16
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181183	0	2	0.00	1.12	0.95	0.16
021283	0	2	0.00	1.12	0.95	0.16

***RECORD 17

0.0 3 0.0

***RECORD 18

0.0 0.00 0.5

***RECORD 19

Hanford fine sandy Loam; Hydrologic Group B;

***RECORD 20

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150.00      0   0   1   0   0   0   0   0   0   0
***RECORD 26
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***RECORD 30 enter Koc value
    4      535
***RECORD 33
    3
***RECORD 34
***RECORD 36
***RECORD 37
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        0.013    0.013    0.000
        0.1      0.125    0.050    0.750      0.00
    2    60.00    1.500    0.210    0.000    0.000    0.00
        0.013    0.013    0.000
        1.0      0.120    0.050    0.200      0.00
    3    60.00    1.500    0.200    0.000    0.000    0.00
        0.013    0.013    0.000
        5.0      0.100    0.050    0.125      0.00
***RECORD 40
    0
***RECORD 42
    YEAR      10          YEAR      10          YEAR      10      1
***RECORD 43
    1
***RECORD 44
    1      -----
***RECORD 45
    1      YEAR
***RECORD 46
    RUNF      TSER

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ATTACHMENT 2: Surface Water Output for Vinclozolin

WATER COLUMN DISSOLVED CONCENTRATION (PPB)

YEAR	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
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1948	6.526	2.565	1.069	.924	.627	.190
1949	6.526	2.565	1.069	.924	.627	.190
1950	6.526	2.565	1.069	.924	.627	.190
1951	6.526	2.565	1.069	.924	.627	.190
1952	6.526	2.565	1.069	.924	.627	.190
1953	6.526	2.565	1.069	.924	.627	.190
1954	6.526	2.565	1.069	.924	.627	.190
1955	6.526	2.565	1.069	.924	.627	.190
1956	6.526	2.565	1.069	.924	.627	.189
1957	6.526	2.565	1.069	.924	.627	.190
1958	6.526	2.565	1.069	.924	.627	.190
1959	6.526	2.565	1.069	.924	.627	.190
1960	6.526	2.565	1.069	.924	.627	.198
1961	6.526	2.565	1.069	.924	.627	.190
1962	6.526	2.565	1.069	.924	.627	.189

1963	6.526	2.565	1.069	.924	.627	.189
1964	6.526	2.565	1.069	.924	.627	.190
1965	6.526	2.565	1.069	.924	.627	.190
1966	6.526	2.565	1.069	.924	.627	.190
1967	6.526	2.565	1.069	.924	.627	.190
1968	6.526	2.565	1.069	.924	.627	.189
1969	6.526	2.565	1.069	.924	.627	.190
1970	6.526	2.565	1.069	.924	.627	.190
1971	6.526	2.565	1.069	.924	.627	.189
1972	6.526	2.565	1.069	.924	.627	.189
1973	6.526	2.565	1.069	.924	.627	.190
1974	6.526	2.565	1.069	.924	.627	.190
1975	6.526	2.565	1.069	.924	.627	.190
1976	6.526	2.565	1.069	.924	.627	.189
1977	6.526	2.565	1.069	.924	.627	.190
1978	6.526	2.565	1.069	.924	.627	.190
1979	6.526	2.565	1.069	.924	.627	.190
1980	6.526	2.565	1.069	.924	.627	.190
1981	6.526	2.565	1.069	.924	.627	.190
1982	6.526	2.565	1.069	.924	.627	.190
1983	6.526	2.565	1.069	.924	.627	.190

SORTED FOR PLOTTING

PROB	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
-----	-----	-----	-----	-----	-----	-----
.027	6.526	2.565	1.069	.924	.627	.198
.054	6.526	2.565	1.069	.924	.627	.190
.081	6.526	2.565	1.069	.924	.627	.190
.108	6.526	2.565	1.069	.924	.627	.190
.135	6.526	2.565	1.069	.924	.627	.190
.162	6.526	2.565	1.069	.924	.627	.190
.189	6.526	2.565	1.069	.924	.627	.190
.216	6.526	2.565	1.069	.924	.627	.190
.243	6.526	2.565	1.069	.924	.627	.190
.270	6.526	2.565	1.069	.924	.627	.190
.297	6.526	2.565	1.069	.924	.627	.190
.324	6.526	2.565	1.069	.924	.627	.190
.351	6.526	2.565	1.069	.924	.627	.190
.378	6.526	2.565	1.069	.924	.627	.190
.405	6.526	2.565	1.069	.924	.627	.190
.432	6.526	2.565	1.069	.924	.627	.190
.459	6.526	2.565	1.069	.924	.627	.190
.486	6.526	2.565	1.069	.924	.627	.190
.514	6.526	2.565	1.069	.924	.627	.190
.541	6.526	2.565	1.069	.924	.627	.190
.568	6.526	2.565	1.069	.924	.627	.190
.595	6.526	2.565	1.069	.924	.627	.190
.622	6.526	2.565	1.069	.924	.627	.190
.649	6.526	2.565	1.069	.924	.627	.190
.676	6.526	2.565	1.069	.924	.627	.190
.703	6.526	2.565	1.069	.924	.627	.190
.730	6.526	2.565	1.069	.924	.627	.190
.757	6.526	2.565	1.069	.924	.627	.190
.784	6.526	2.565	1.069	.924	.627	.190

.811	6.526	2.565	1.069	.924	.627	.189
.838	6.526	2.565	1.069	.924	.627	.189
.865	6.526	2.565	1.069	.924	.627	.189
.892	6.526	2.565	1.069	.924	.627	.189
.919	6.526	2.565	1.069	.924	.627	.189
.946	6.526	2.565	1.069	.924	.627	.189
.973	6.526	2.565	1.069	.924	.627	.189
1/10	6.526	2.565	1.069	.924	.627	.190*

MEAN OF ANNUAL VALUES = .190
 STANDARD DEVIATION OF ANNUAL VALUES = .002
 UPPER 90% CONFIDENCE LIMIT ON MEAN = .190

*Values presented in Table 1 have been reduced by the percent crop area factor given in Table 2.

ATTACHMENT 3. SCIGROW INFORMATION for Vinclozolin

RUN No.	1 FOR vinclozolin		INPUT VALUES		
APPL (#/AC) RATE	APPL. NO.	URATE (#/AC/YR)	SOIL KOC	SOIL METABOLISM (DAYS)	AEROBIC
1.000	5	5.000	505.5	45.5	
GROUND-WATER SCREENING CONCENTRATIONS IN PPB					
.530691					
A= 40.500	B= 510.500	C= 1.607	D= 2.708	RILP= 2.077	
F= -.974	G= .106	URATE= 5.000	GWSC=	.530691	

ATTACHMENT 4: PRZM Input File for DCA

```
***PRZM 3.1 Input Data File: dca_indx.inp***
***CalOnion.INP, created 27 January 2000; Stanislaus county, CA.***
***Soil Hanford, Hydrologic Group B ***
***Assume poor grass coverage under vines and overland flow***
Vinclozolin
Hanford fine sandyloam; MLRA L-17, Stanislaus County, CA
***RECORD 3
  0.852  0.450      0   15.00      1      3
***RECORD 6
  4
***RECORD 7
  0.34    0.15     1.00   172.8    5.80      3   0.500   464.0
***RECORD 8
  1
***RECORD 9
```

1	0.25	90.00	100.00	3	86	59	82	0.00	50.0
---	------	-------	--------	---	----	----	----	------	------

***RECORD 9A
 1 3
 0101 0110 0111
 0.05 0.05 0.05
 .023 .023 .023
 ***RECORD 10
 36
 070947 150448 010548 1
 070948 150449 010549 1
 070949 150450 010550 1
 070950 150451 010551 1
 070951 150452 010552 1
 070952 150453 010553 1
 070953 150454 010554 1
 070954 150455 010555 1
 070955 150456 010556 1
 070956 150457 010557 1
 070957 150458 010558 1
 070958 150459 010559 1
 070959 150460 010560 1
 070960 150461 010561 1
 070961 150462 010562 1
 070962 150463 010563 1
 070963 150464 010564 1
 070964 150465 010565 1
 070965 150466 010566 1
 070966 150467 010567 1
 070967 150468 010568 1
 070968 150469 010569 1
 070969 150470 010570 1
 070970 150471 010571 1
 070971 150472 010572 1
 070972 150473 010573 1
 070973 150474 010574 1
 070974 150475 010575 1
 070975 150476 010576 1
 070976 150477 010577 1
 070977 150478 010578 1
 070978 150479 010579 1
 070979 150480 010580 1
 070980 150481 010581 1
 070981 150482 010582 1
 070982 150483 010583 1
 ***RECORD 12
 Application Schedule:aerial spray
 ***RECORD 13
 180 1 0 0
 ***RECORD 15
 VINCONZOLIN
 ***RECORD 16
 071048 0 2 0.00 0.63 0.95 0.16
 211048 0 2 0.00 0.63 0.95 0.16
 041148 0 2 0.00 0.63 0.95 0.16
 181148 0 2 0.00 0.63 0.95 0.16

021248	0	2	0.00	0.63	0.95	0.16
071049	0	2	0.00	0.63	0.95	0.16
211049	0	2	0.00	0.63	0.95	0.16
041149	0	2	0.00	0.63	0.95	0.16
181149	0	2	0.00	0.63	0.95	0.16
021249	0	2	0.00	0.63	0.95	0.16
071050	0	2	0.00	0.63	0.95	0.16
211050	0	2	0.00	0.63	0.95	0.16
041150	0	2	0.00	0.63	0.95	0.16
181150	0	2	0.00	0.63	0.95	0.16
021250	0	2	0.00	0.63	0.95	0.16
071051	0	2	0.00	0.63	0.95	0.16
211051	0	2	0.00	0.63	0.95	0.16
041151	0	2	0.00	0.63	0.95	0.16
181151	0	2	0.00	0.63	0.95	0.16
021251	0	2	0.00	0.63	0.95	0.16
071052	0	2	0.00	0.63	0.95	0.16
211052	0	2	0.00	0.63	0.95	0.16
041152	0	2	0.00	0.63	0.95	0.16
181152	0	2	0.00	0.63	0.95	0.16
021252	0	2	0.00	0.63	0.95	0.16
071053	0	2	0.00	0.63	0.95	0.16
211053	0	2	0.00	0.63	0.95	0.16
041153	0	2	0.00	0.63	0.95	0.16
181153	0	2	0.00	0.63	0.95	0.16
021253	0	2	0.00	0.63	0.95	0.16
071054	0	2	0.00	0.63	0.95	0.16
211054	0	2	0.00	0.63	0.95	0.16
041154	0	2	0.00	0.63	0.95	0.16
181154	0	2	0.00	0.63	0.95	0.16
021254	0	2	0.00	0.63	0.95	0.16
071055	0	2	0.00	0.63	0.95	0.16
211055	0	2	0.00	0.63	0.95	0.16
041155	0	2	0.00	0.63	0.95	0.16
181155	0	2	0.00	0.63	0.95	0.16
021255	0	2	0.00	0.63	0.95	0.16
071056	0	2	0.00	0.63	0.95	0.16
211056	0	2	0.00	0.63	0.95	0.16
041156	0	2	0.00	0.63	0.95	0.16
181156	0	2	0.00	0.63	0.95	0.16
021256	0	2	0.00	0.63	0.95	0.16
071057	0	2	0.00	0.63	0.95	0.16
211057	0	2	0.00	0.63	0.95	0.16
041157	0	2	0.00	0.63	0.95	0.16
181157	0	2	0.00	0.63	0.95	0.16
021257	0	2	0.00	0.63	0.95	0.16
071058	0	2	0.00	0.63	0.95	0.16
211058	0	2	0.00	0.63	0.95	0.16
041158	0	2	0.00	0.63	0.95	0.16
181158	0	2	0.00	0.63	0.95	0.16
021258	0	2	0.00	0.63	0.95	0.16
071059	0	2	0.00	0.63	0.95	0.16
211059	0	2	0.00	0.63	0.95	0.16
041159	0	2	0.00	0.63	0.95	0.16
181159	0	2	0.00	0.63	0.95	0.16

021259	0	2	0.00	0.63	0.95	0.16
071060	0	2	0.00	0.63	0.95	0.16
211060	0	2	0.00	0.63	0.95	0.16
041160	0	2	0.00	0.63	0.95	0.16
181160	0	2	0.00	0.63	0.95	0.16
021260	0	2	0.00	0.63	0.95	0.16
071061	0	2	0.00	0.63	0.95	0.16
211061	0	2	0.00	0.63	0.95	0.16
041161	0	2	0.00	0.63	0.95	0.16
181161	0	2	0.00	0.63	0.95	0.16
021261	0	2	0.00	0.63	0.95	0.16
071062	0	2	0.00	0.63	0.95	0.16
211062	0	2	0.00	0.63	0.95	0.16
041162	0	2	0.00	0.63	0.95	0.16
181162	0	2	0.00	0.63	0.95	0.16
021262	0	2	0.00	0.63	0.95	0.16
071063	0	2	0.00	0.63	0.95	0.16
211063	0	2	0.00	0.63	0.95	0.16
041163	0	2	0.00	0.63	0.95	0.16
181163	0	2	0.00	0.63	0.95	0.16
021263	0	2	0.00	0.63	0.95	0.16
071064	0	2	0.00	0.63	0.95	0.16
211064	0	2	0.00	0.63	0.95	0.16
041164	0	2	0.00	0.63	0.95	0.16
181164	0	2	0.00	0.63	0.95	0.16
021264	0	2	0.00	0.63	0.95	0.16
071065	0	2	0.00	0.63	0.95	0.16
211065	0	2	0.00	0.63	0.95	0.16
041165	0	2	0.00	0.63	0.95	0.16
181165	0	2	0.00	0.63	0.95	0.16
021265	0	2	0.00	0.63	0.95	0.16
071066	0	2	0.00	0.63	0.95	0.16
211066	0	2	0.00	0.63	0.95	0.16
041166	0	2	0.00	0.63	0.95	0.16
181166	0	2	0.00	0.63	0.95	0.16
021266	0	2	0.00	0.63	0.95	0.16
071067	0	2	0.00	0.63	0.95	0.16
211067	0	2	0.00	0.63	0.95	0.16
041167	0	2	0.00	0.63	0.95	0.16
181167	0	2	0.00	0.63	0.95	0.16
021267	0	2	0.00	0.63	0.95	0.16
071068	0	2	0.00	0.63	0.95	0.16
211068	0	2	0.00	0.63	0.95	0.16
041168	0	2	0.00	0.63	0.95	0.16
181168	0	2	0.00	0.63	0.95	0.16
021268	0	2	0.00	0.63	0.95	0.16
071069	0	2	0.00	0.63	0.95	0.16
211069	0	2	0.00	0.63	0.95	0.16
041169	0	2	0.00	0.63	0.95	0.16
181169	0	2	0.00	0.63	0.95	0.16
021269	0	2	0.00	0.63	0.95	0.16
071070	0	2	0.00	0.63	0.95	0.16
211070	0	2	0.00	0.63	0.95	0.16
041170	0	2	0.00	0.63	0.95	0.16
181170	0	2	0.00	0.63	0.95	0.16

021270	0	2	0.00	0.63	0.95	0.16
071071	0	2	0.00	0.63	0.95	0.16
211071	0	2	0.00	0.63	0.95	0.16
041171	0	2	0.00	0.63	0.95	0.16
181171	0	2	0.00	0.63	0.95	0.16
021271	0	2	0.00	0.63	0.95	0.16
071072	0	2	0.00	0.63	0.95	0.16
211072	0	2	0.00	0.63	0.95	0.16
041172	0	2	0.00	0.63	0.95	0.16
181172	0	2	0.00	0.63	0.95	0.16
021272	0	2	0.00	0.63	0.95	0.16
071073	0	2	0.00	0.63	0.95	0.16
211073	0	2	0.00	0.63	0.95	0.16
041173	0	2	0.00	0.63	0.95	0.16
181173	0	2	0.00	0.63	0.95	0.16
021273	0	2	0.00	0.63	0.95	0.16
071074	0	2	0.00	0.63	0.95	0.16
211074	0	2	0.00	0.63	0.95	0.16
041174	0	2	0.00	0.63	0.95	0.16
181174	0	2	0.00	0.63	0.95	0.16
021274	0	2	0.00	0.63	0.95	0.16
071075	0	2	0.00	0.63	0.95	0.16
211075	0	2	0.00	0.63	0.95	0.16
041175	0	2	0.00	0.63	0.95	0.16
181175	0	2	0.00	0.63	0.95	0.16
021275	0	2	0.00	0.63	0.95	0.16
071076	0	2	0.00	0.63	0.95	0.16
211076	0	2	0.00	0.63	0.95	0.16
041176	0	2	0.00	0.63	0.95	0.16
181176	0	2	0.00	0.63	0.95	0.16
021276	0	2	0.00	0.63	0.95	0.16
071077	0	2	0.00	0.63	0.95	0.16
211077	0	2	0.00	0.63	0.95	0.16
041177	0	2	0.00	0.63	0.95	0.16
181177	0	2	0.00	0.63	0.95	0.16
021277	0	2	0.00	0.63	0.95	0.16
071078	0	2	0.00	0.63	0.95	0.16
211078	0	2	0.00	0.63	0.95	0.16
041178	0	2	0.00	0.63	0.95	0.16
181178	0	2	0.00	0.63	0.95	0.16
021278	0	2	0.00	0.63	0.95	0.16
071079	0	2	0.00	0.63	0.95	0.16
211079	0	2	0.00	0.63	0.95	0.16
041179	0	2	0.00	0.63	0.95	0.16
181179	0	2	0.00	0.63	0.95	0.16
021279	0	2	0.00	0.63	0.95	0.16
071080	0	2	0.00	0.63	0.95	0.16
211080	0	2	0.00	0.63	0.95	0.16
041180	0	2	0.00	0.63	0.95	0.16
181180	0	2	0.00	0.63	0.95	0.16
021280	0	2	0.00	0.63	0.95	0.16
071081	0	2	0.00	0.63	0.95	0.16
211081	0	2	0.00	0.63	0.95	0.16
041181	0	2	0.00	0.63	0.95	0.16
181181	0	2	0.00	0.63	0.95	0.16

```

021281 0 2 0.00 0.63 0.95 0.16
071082 0 2 0.00 0.63 0.95 0.16
211082 0 2 0.00 0.63 0.95 0.16
041182 0 2 0.00 0.63 0.95 0.16
181182 0 2 0.00 0.63 0.95 0.16
021282 0 2 0.00 0.63 0.95 0.16
071083 0 2 0.00 0.63 0.95 0.16
211083 0 2 0.00 0.63 0.95 0.16
041183 0 2 0.00 0.63 0.95 0.16
181183 0 2 0.00 0.63 0.95 0.16
021283 0 2 0.00 0.63 0.95 0.16
***RECORD 17
      0.0      3      0.0
***RECORD 18
      0.0      0.00      0.5
***RECORD 19
Hanford fine sandy Loam; Hydrologic Group B;
***RECORD 20
    150.00      0      0      1      0      0      0      0      0
***RECORD 26
      0.0      0.0      0.0
***RECORD 30 enter Koc value
      4      309
***RECORD 33
      3
***RECORD 34
***RECORD 36
***RECORD 37
      1      30.00      1.500      0.222      0.000      0.000      0.00
                  0.000      0.000      0.000
                  0.1      0.125      0.050      0.750      0.00
      2      60.00      1.500      0.210      0.000      0.000      0.00
                  0.000      0.000      0.000
                  1.0      0.120      0.050      0.200      0.00
      3      60.00      1.500      0.200      0.000      0.000      0.00
                  0.000      0.000      0.000
                  5.0      0.100      0.050      0.125      0.00
***RECORD 40
      0
***RECORD 42
          YEAR      10          YEAR      10          YEAR      10      1
***RECORD 43
      1
***RECORD 44
      1      -----
***RECORD 45
      1      YEAR
***RECORD 46
      RUNF      TSER

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ATTACHMENT 5: Surface Water Output for DCA

WATER COLUMN DISSOLVED CONCENTRATION (PPB)

YEAR	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
1948	7.676	7.046	5.879	5.058	4.165	1.059
1949	27.550	26.610	23.090	15.440	11.150	3.845
1950	11.450	11.060	9.607	6.435	4.653	2.223
1951	12.850	12.420	10.780	7.221	5.221	2.372
1952	18.310	17.690	15.360	10.280	7.429	2.906
1953	17.370	16.780	14.570	9.754	7.051	2.826
1954	12.220	11.810	10.260	6.874	4.972	2.310
1955	12.720	12.290	10.670	7.151	5.171	2.362
1956	12.480	12.060	10.470	7.016	5.074	2.330
1957	16.230	15.680	13.620	9.116	6.590	2.731
1958	10.830	10.470	9.090	6.092	4.407	2.158
1959	14.950	14.440	12.540	8.397	6.071	2.627
1960	25.270	24.420	21.200	14.180	10.250	3.643
1961	7.701	7.071	5.904	5.084	4.191	1.431
1962	10.680	10.320	8.967	6.010	4.347	2.168
1963	16.080	15.540	13.490	9.031	6.528	2.693
1964	11.930	11.530	10.010	6.710	4.853	2.316
1965	35.870	34.660	30.080	20.120	14.530	4.677
1966	17.990	17.380	15.090	10.110	7.311	2.895
1967	7.703	7.073	5.906	5.085	4.193	1.677
1968	7.787	7.150	6.008	5.276	4.356	1.811
1969	23.030	22.250	19.310	12.920	9.336	3.388
1970	14.490	14.000	12.150	8.141	5.887	2.542
1971	11.230	10.860	9.429	6.319	4.571	2.199
1972	28.810	27.830	24.150	16.160	11.670	4.003
1973	8.780	8.486	7.375	5.087	4.194	1.958
1974	14.850	14.350	12.460	8.346	6.034	2.567
1975	7.700	7.355	6.391	5.083	4.190	1.838
1976	14.970	14.470	12.560	8.408	6.078	2.577
1977	20.760	20.060	17.410	11.650	8.420	3.172
1978	18.920	18.280	15.870	10.730	7.781	3.032
1979	23.330	22.540	19.560	13.090	9.463	3.424
1980	14.710	14.210	12.340	8.268	5.979	2.552
1981	15.760	15.230	13.220	8.854	6.402	2.663
1982	19.610	18.950	16.450	11.010	7.960	3.046
1983	11.090	10.470	9.096	7.323	6.028	2.641

SORTED FOR PLOTTING

PROB	PEAK	96 HOUR	21 DAY	60 DAY	90 DAY	YEARLY
.027	35.870	34.660	30.080	20.120	14.530	4.677
.054	28.810	27.830	24.150	16.160	11.670	4.003

.081	27.550	26.610	23.090	15.440	11.150	3.845
.108	25.270	24.420	21.200	14.180	10.250	3.643
.135	23.330	22.540	19.560	13.090	9.463	3.424
.162	23.030	22.250	19.310	12.920	9.336	3.388
.189	20.760	20.060	17.410	11.650	8.420	3.172
.216	19.610	18.950	16.450	11.010	7.960	3.046
.243	18.920	18.280	15.870	10.730	7.781	3.032
.270	18.310	17.690	15.360	10.280	7.429	2.906
.297	17.990	17.380	15.090	10.110	7.311	2.895
.324	17.370	16.780	14.570	9.754	7.051	2.826
.351	16.230	15.680	13.620	9.116	6.590	2.731
.378	16.080	15.540	13.490	9.031	6.528	2.693
.405	15.760	15.230	13.220	8.854	6.402	2.663
.432	14.970	14.470	12.560	8.408	6.078	2.641
.459	14.950	14.440	12.540	8.397	6.071	2.627
.486	14.850	14.350	12.460	8.346	6.034	2.577
.514	14.710	14.210	12.340	8.268	6.028	2.567
.541	14.490	14.000	12.150	8.141	5.979	2.552
.568	12.850	12.420	10.780	7.323	5.887	2.542
.595	12.720	12.290	10.670	7.221	5.221	2.372
.622	12.480	12.060	10.470	7.151	5.171	2.362
.649	12.220	11.810	10.260	7.016	5.074	2.330
.676	11.930	11.530	10.010	6.874	4.972	2.316
.703	11.450	11.060	9.607	6.710	4.853	2.310
.730	11.230	10.860	9.429	6.435	4.653	2.223
.757	11.090	10.470	9.096	6.319	4.571	2.199
.784	10.830	10.470	9.090	6.092	4.407	2.168
.811	10.680	10.320	8.967	6.010	4.356	2.158
.838	8.780	8.486	7.375	5.276	4.347	1.958
.865	7.787	7.355	6.391	5.087	4.194	1.838
.892	7.703	7.150	6.008	5.085	4.193	1.811
.919	7.701	7.073	5.906	5.084	4.191	1.677
.946	7.700	7.071	5.904	5.083	4.190	1.431
.973	7.676	7.046	5.879	5.058	4.165	1.059
1/10	25.954	25.077	21.767	14.558	10.520	3.704

MEAN OF ANNUAL VALUES = 2.630

STANDARD DEVIATION OF ANNUAL VALUES = .725

UPPER 90% CONFIDENCE LIMIT ON MEAN = 2.808

ATTACHMENT 6. DCA mean EEC Calculations.

Table 6-1 shows the net mean DCA concentrations in the EXAMS pond. The net DCA concentration is the concentration of DCA calculated by assuming total and instantaneous vinclozolin degradation to DCA on the onion field minus the concentration of vinclozolin in the pond calculated by

a separate PRZM/EXAMS run. Calculations are described in the column headings. Probability distributions are given in Table 6-2 and were calculated by the same method used by EFED's computer program *Table20*. The 1-in-10 year mean, the mean, the standard deviation, and the upper 98% confidence limit are given below Table 6-2.

Table 6-1. Annual mean concentrations for net DCA.

(A) Year	(B) Vinclozolin Conc. [mg/L]	(C) DCA Conc. [mg/L]	(D) DCA equivalent of undegraded vinclozolin [mg/L]	(E) Net DCA [mg/L]
(see Attachment 1)		(see Attachment 3)	(B) x 0.566*	(C)-(D)
1948	0.19	1.059	0.108	0.951
1949	0.19	3.845	0.108	3.737
1950	0.19	2.223	0.108	2.115
1951	0.19	2.372	0.108	2.264
1952	0.19	2.906	0.108	2.798
1953	0.19	2.826	0.108	2.718
1954	0.19	2.31	0.108	2.202
1955	0.19	2.362	0.108	2.254
1956	0.189	2.33	0.107	2.223
1957	0.19	2.731	0.108	2.623
1958	0.19	2.158	0.108	2.050
1959	0.19	2.627	0.108	2.519
1960	0.198	3.643	0.112	3.531
1961	0.19	1.431	0.108	1.323
1962	0.189	2.168	0.107	2.061
1963	0.189	2.693	0.107	2.586
1964	0.19	2.316	0.108	2.208
1965	0.19	4.677	0.108	4.569
1966	0.19	2.895	0.108	2.787
1967	0.19	1.677	0.108	1.569
1968	0.189	1.811	0.107	1.704
1969	0.19	3.388	0.108	3.280
1970	0.19	2.542	0.108	2.434
1971	0.189	2.199	0.107	2.092
1972	0.189	4.003	0.107	3.896
1973	0.19	1.958	0.108	1.850
1974	0.19	2.567	0.108	2.459
1975	0.19	1.838	0.108	1.730
1976	0.189	2.577	0.107	2.470
1977	0.19	3.172	0.108	3.064
1978	0.19	3.032	0.108	2.924
1979	0.19	3.424	0.108	3.316
1980	0.19	2.552	0.108	2.444
1981	0.19	2.663	0.108	2.555
1982	0.19	3.046	0.108	2.938
1983	0.19	2.641	0.108	2.533

* $MW_{DCA}/MW_{vinclozolin} = 162.03 / 286.1 = 0.566$

Table 6-2. Probability distribution for net DCA.

Year	Prob	DCA ($\mu\text{g}/\text{L}$)
1965	0.027	4.569
1972	0.054	3.896
1949	0.081	3.737
1960	0.108	3.531
1979	0.135	3.316
1969	0.162	3.280
1977	0.189	3.064
1982	0.216	2.938
1978	0.243	2.924
1952	0.270	2.798
1966	0.297	2.787
1953	0.324	2.718
1957	0.351	2.623
1963	0.378	2.586
1981	0.405	2.555
1983	0.432	2.533
1959	0.459	2.519
1976	0.486	2.470
1974	0.514	2.459
1980	0.541	2.444
1970	0.568	2.434
1951	0.595	2.264
1955	0.622	2.254
1956	0.649	2.223
1964	0.676	2.208
1954	0.703	2.202
1950	0.730	2.115
1971	0.757	2.092
1962	0.784	2.061
1958	0.811	2.050
1973	0.838	1.850
1975	0.865	1.730
1968	0.892	1.704
1967	0.919	1.569
1961	0.946	1.323
1948	0.973	0.951

1-in-10 year annual mean = 3.593 $\mu\text{g}/\text{L}$ (chronic EEC for DCA; not adjusted by percent crop area factor)

mean = 2.522 $\mu\text{g}/\text{L}$

standard deviation = 0.725 $\mu\text{g}/\text{L}$

upper(one-sided) 90% C.I. = 2.68 $\mu\text{g}/\text{L}$

ATTACHMENT 7. SCIGROW INFORMATION for DCA

RUN No. 1 FOR DCA INPUT VALUES

APPL (#/AC) APPL. URATE SOIL SOIL AEROBIC
RATE NO. (#/AC/YR) KOC METABOLISM (DAYS)

.566 1 .566 309.0 100000.0

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

2.653927

A= 1500.000 B= 314.000 C= 3.176 D= 2.497 RILP= 4.774
F= .671 G= 4.689 URATE= .566 GWSC= 2.653927